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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

On re Application of

Atty. Docket

WALID ALI

US 010194

Serial No.: 09/938,377

Group Art Unit: 2661

Filed: AUGUST 24, 2001

Title: AN APPARATUS AND METHOD FOR COMBINING RANDOM SET OF VIDEO FEATURES IN A NON-LINEAR SCHEME TO BEST DESCRIBE PERCEPTUAL QUALITY OF VIDEO SEQUENCES USING HEURISTIC SEARCH METHODOLOGY

Commissioner for Patents
Washington, D.C. 20231

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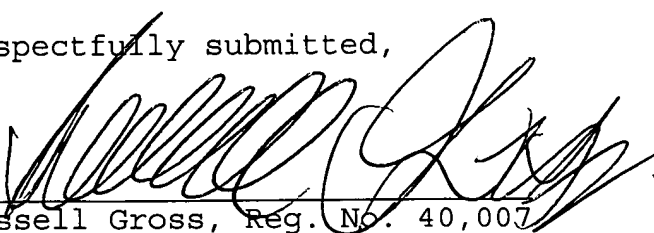
LETTER TO OFFICIAL DRAFTSMAN

Technology Center 2600

Sir:

Enclosed are (4) four sheets of formal drawings
for filing in the above-identified application.

Respectfully submitted,

By 
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being
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On April 23, 2002

By John Chaga

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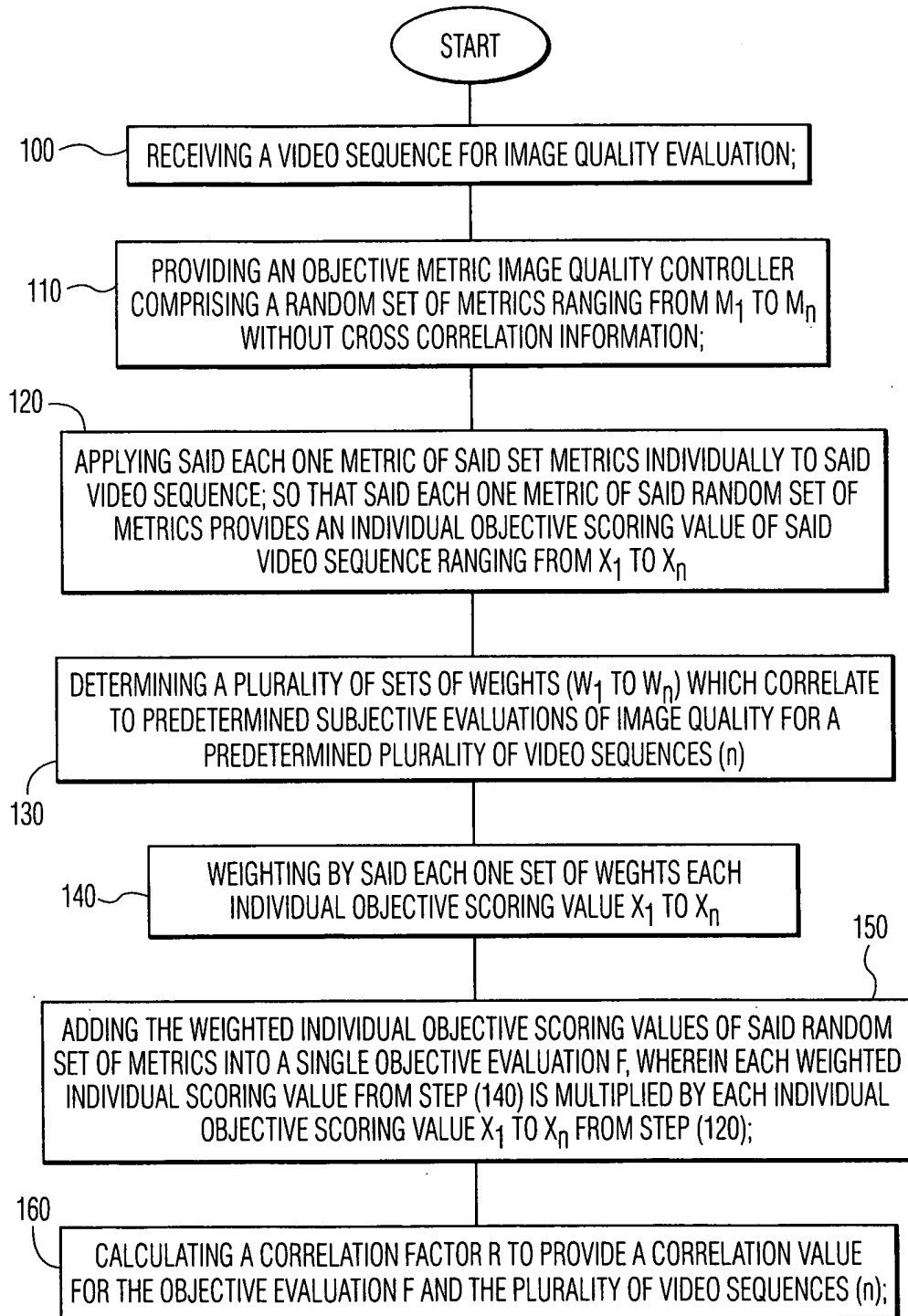


FIG. 1A

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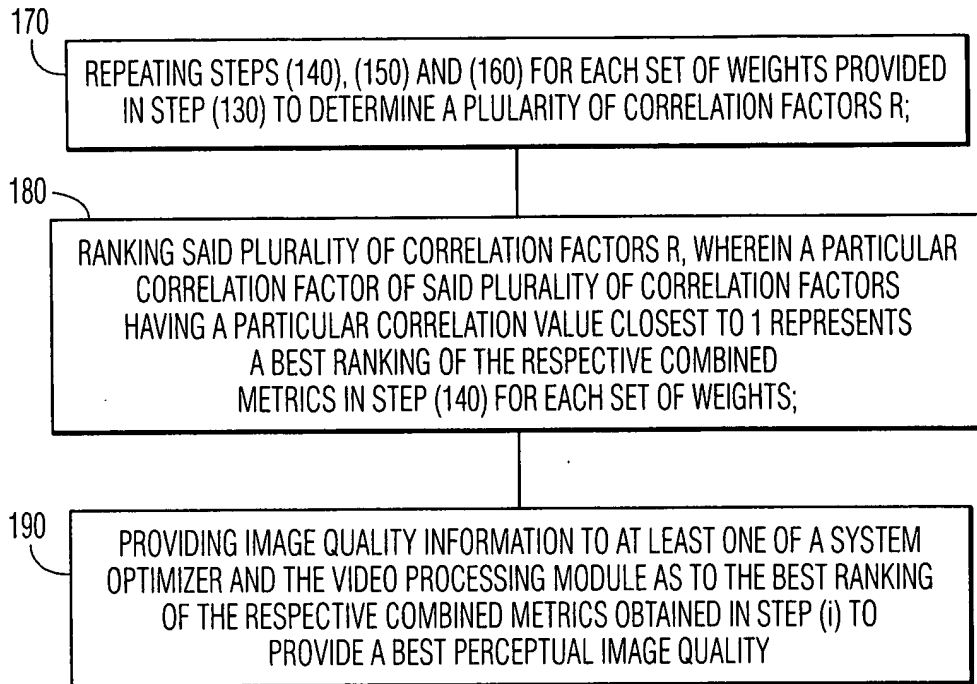


FIG. 1B

WHEN A PREDETERMINED NUMBER OF SETS OF METRICS = n, THE QUADRATIC MODEL TO OBTAIN THE OBJECTIVE EVALUATION F IS:

$$F = \left(\sum_{i=1}^n w_i x_i \right)^2, \text{ WHEREIN "n" IS A NON-ZERO VALUE.}$$

FIG. 1C

WHEN A NUMBER OF THE SET OF METRICS = 4, THEN THE QUADRATIC MODEL TO OBTAIN THE OBJECTIVE EVALUATION F IS:

$$F = w_1^2 x_1^2 + w_2^2 x_2^2 + w_3^2 x_3^2 + w_4^2 x_4^2 + w_5 x_1 x_2^2 + w_6 x_1 x_3^2 + w_7 x_1 x_4^2 + w_8 x_2 x_3^2 + w_9 x_2 x_4^2 + w_{10} x_3 x_4^2$$

FIG. 1D

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SELECTING A BEST OF WEIGHTS FROM THE PLURALITY OF SETS OF WEIGHTS PROVIDED IN STEP (130), SAID BEST SET OF WEIGHTS BEING HEURISTICALLY DETERMINED BY A GENETIC ALGORITHM THAT INCREASES DYNAMICALLY A SIZE OF THE ASSIGNED RANGE OF SAID EACH ONE SET OF WEIGHTS PROVIDED IN STEP (130).

FIG. 1E

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SELECTING A BEST OF WEIGHTS FROM THE PLURALITY OF SETS OF WEIGHTS PROVIDED IN STEP (130), SAID BEST SET OF WEIGHTS BEING HEURISTICALLY DETERMINED BY A GENETIC ALGORITHM THAT ENABLES FINDING THE BEST SOLUTION THAT MAXIMIZES THE CORRELATION FACTOR R OF THE OVERALL OBJECTIVE IMAGE QUALITY F WITH THE SUBJECTIVE EVALUATION WITHOUT THE NEED TO CARRY OUT AN EXHAUSTIVE SEARCH TO FIND THE BEST SET OF WEIGHTS.

FIG. 1F

CALCULATING OF THE CORRELATION FACTOR R IN STEP (160) BY USING A SPEARMAN RANK ORDER COMPRISING THE FOLLOWING EQUATION:

$$R = 1 - \frac{6 \cdot (X - Y)^T (X - Y)}{k(k^2 - 1)}$$

WHEREIN X IS EQUAL TO A VECTOR OF RANKED k OBJECTIVE VALUES FOR THE k SEQUENCES (k*1), AND

Y IS EQUAL TO A VECTOR OF RANKED k SUBJECTIVE EVALUATION FOR THE k SEQUENCES (k*1).

FIG. 2

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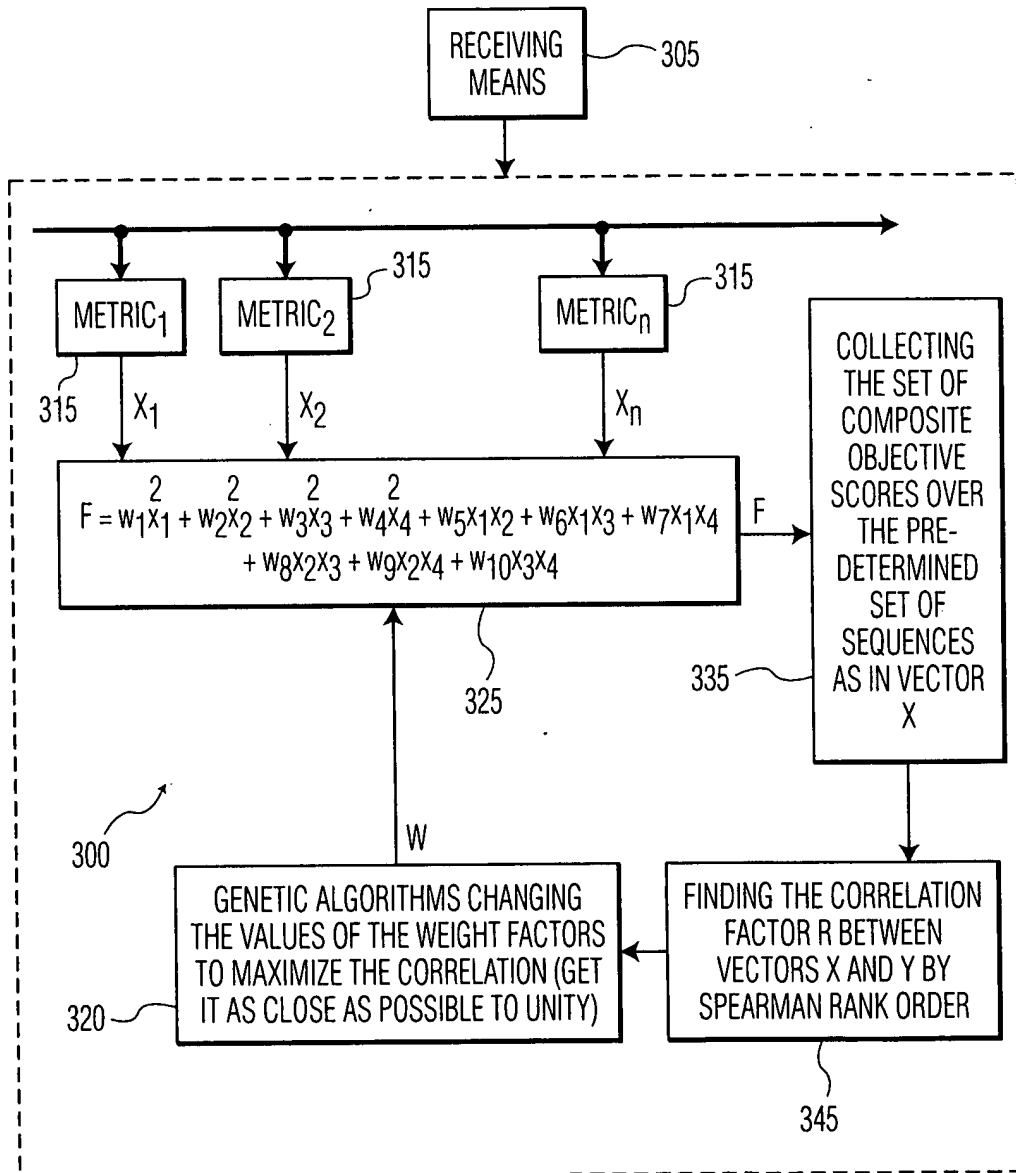


FIG. 3